Title: The Fat and the Lean

A self-awareness lesson involving nutrition and technology to introduce equations

Link to Outcomes:

- **Problem Solving** Students will use personal nutritional information and mathematics to develop a realistic plan for calorie and fat intake.
- **Communication** Students will cooperatively determine calorie and fat consumption. The class will discuss individual results.
- **Reasoning** Students will make conjectures about their calorie and fat levels, and then determine accuracy of these conjectures.
- **Connections** Students will discover connections between personal nutrition and mathematics.
- **Algebra** Students will use algebraic equations to determine actual and recommended calorie and fat intake.
- **Statistics** Students will draw inferences from tables constructed based on their data.
- **Technology** Students will use the TI-82 graphics calculator to construct tables.

Brief Overview:

Many adolescents have not developed proper eating habits; therefore, they are unaware of the nutritional value in the foods they consume. In this activity, students will evaluate their personal nutrition using tables and equations. Each student will record food consumption for a two-day period, determine fat and calorie intake, and develop nutritional goals.

Grade/Level:

Grades 9-12: Basic Algebra/Algebra I/Algebra-Geometry

Duration:

This activity will span two blocks or four class periods.

Prerequisite Knowledge:

Students must be familiar with TI-82 graphics calculators. Students must be able to record and interpret data accurately. Students must possess the ability to communicate effectively in groups.

Objectives:

Students will:

- estimate and determine accuracy.
- average their daily calorie and fat intake.
- create and interpret tables.
- make conclusions based on data and apply them to their personal lives.
- effectively use written and oral communication.
- determine the percentage of fat calories to total calories.
- further develop their proficiency with TI-82 graphics calculators.

Materials/Resources/Printed Materials:

- TI-82 graphics calculators
- Student worksheets - Student Resource #1 - #3
- Information obtained from The Fitness Center of Fairfax
- Fast Food Facts (International Diabetes Center)
- The Fat Book (Karen J. Bellerson)

Development/Procedures:

In preparation for the first activity, students will prepare a two-day food diary consisting of all foods and beverages consumed. Students will be arranged in pairs at the beginning of the lesson, and TI-82 graphics calculators will be distributed.

Activity 1: Food Diary Analysis

Students will make hypotheses regarding the number of calories and fat grams in each food item and record these in the *Food Diary Analysis Table* (Student Resource #1). Students will use The Fat Book to determine actual fat grams and calories. Students will write their reactions to these results on the *What Do You Think?* sheet (Student Resource #2).

Activity 2: How Much Fat?

Each student will use actual data from **Activity 1** to determine individual average daily calorie and fat intake. These results will then be compiled into a class list on the *How Much Fat?* sheet (Student Resource #3). Students will enter lists into tables on the TI-82 graphics calculators (see *Figure 1*) (Student Resource #4). Lists 1 and 2 will be the students' averages for calories and fat grams, respectively. For list 3, which will determine percentage of fat calories, the formula $L_3 = 9 * L_2 / L_1 * 100$ will be the input. For list 4, which calculates the suggested minimum fat grams relative to the calories consumed, the formula $L_4 = L_1 * .2 / 9$ will be input. The formula for the suggested maximum fat grams relative to the calories consumed will be $L_5 = L_1 * .3 / 9$.

Activity 3: What Do You Think?

Students will use their average daily calorie intake and their personal ideal weight loss or gain to determine their daily calorie intake goal. Each student will enter his/her personal information into a TI-82 graphics calculator. List 1 will consist of each student's average daily calorie intake. In List 2, the student will enter the amount of pounds that he/she would like to lose (negative number), to gain (positive number) or to maintain (zero). To calculate the recommended number of weeks, List 3, to obtain the weight change, students will enter the equation $L_3 = \text{abs}(L_2) / 2$. List 4 will consist of the student's daily calorie change that should occur. To obtain this, the formula $L_4 = L_2 * 3500 / (L3 * 7)$ will be entered. The equation $L_5 = L_1 + L_4$ will be used to determine the student's daily intake goal. This may be unrealistic since variables mentioned in the extension were not considered. Students will complete the last two questions on the *What Do You Think?* sheet (Student Resource #2).

Evaluation:

The teacher will circulate around the room to observe students making their hypotheses. Students will be evaluated in the areas of participation, accuracy of calculations, completion of assignments (tables and written), and proficiency in using the TI-82 graphics calculator.

Extension/Follow Up:

As an extension, the class will discuss other variables affecting weight gain or loss. Examples of these variables could be level and amount of activity, genetics, metabolism, and body type. The class will also discuss the various food groups and daily requirements of each. For those students interested in tracking their progress to meet their weight loss (or gain) goals, weekly food diaries will be available for them in order to record food intake and calculate calories and fat.

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Name: _____

FOOD DIARY ANALYSIS TABLE **Date: _____ Period: _____**

FOOD ITEM	AMOUNT	CALORIES	FAT GRAMS

Student Resource #2

Name: _____

WHAT DO YOU THINK? **Date: _____ Period: _____**

Read the following questions. Think about your answer and then write your answer completely. Be sure to use complete sentences.

1. What is your reaction to the differences between your estimates of calories and fat and the actual calories and fat? Did these results surprise you? Explain your answer.

2. Complete the table with data determined using the TI-82 graphics calculator.

AVERAGE CALORIE INTAKE PER DAY	POUNDS TO LOSE(-) OR GAIN(+)	TIME (IN WEEKS)	CALORIE CHANGE	DAILY INTAKE GOAL

3. What is your long-term goal weight? What is your plan to achieve this goal? Explain your answers fully.

4. How do you think activity will impact this goal weight? Explain your answer.

Student Resource #3

Name: ________________________

HOW MUCH FAT? **Date: _________ Period: ________**

CALORIES	FAT GRAMS	PERCENT FAT	MINIMUM FAT	MAXIMUM FAT

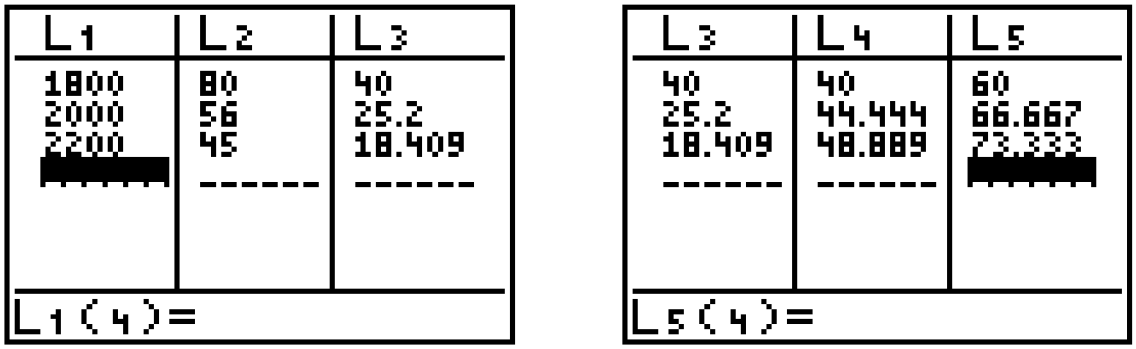

Figure 1

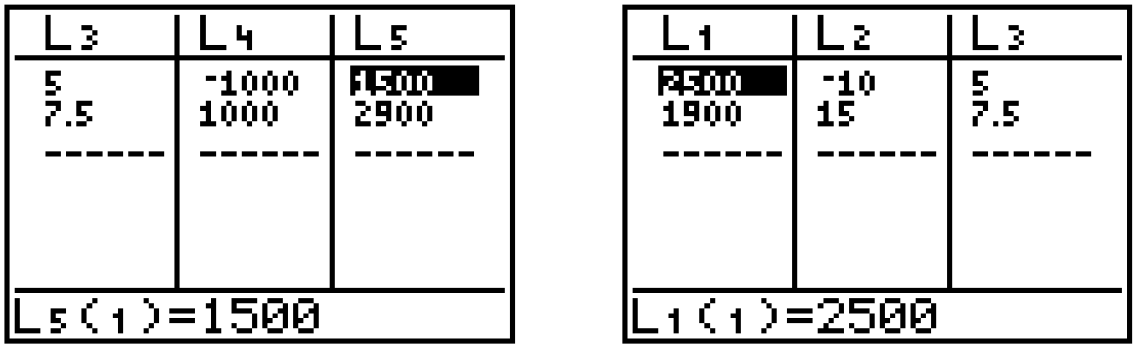

Figure 2